LOAD RATINGS

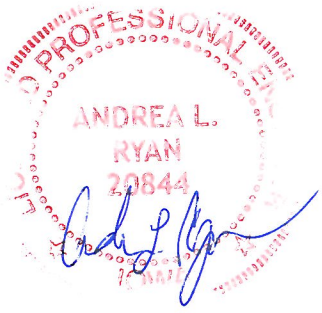
FOR

STANDARD BRIDGES

Final Report

For

TR-713



December 2016

IOWA DOT

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16. Abstract

Bridge standard designs are load rated to evaluate of the capacity of the bridges to carry vehicle loads. The resulting ratings are tabulated by bridge type. The following bridge standards are load rated: H30-94, J24-87, J30C-87, J24-06, J30-06, J40-06, J44-06, RS40-04 and RS40-10. The following vehicles are evaluated: Special Hauling Vehicles (SU4, SU5, SU6, and SU7) at the operating level, Legal Trucks (Types 4, 3S3A, 3-3, 3S3B and 4S3) at the operating level, and HS20-44 truck at the inventory and operating level. The rating procedure utilizes Load Factor methodology and LARS Bridge software. Load rating results listed are in compliance with the 2011 AASHTO Manual for Bridge Evaluation, second edition.

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ENGINEERING STUDY
IOWA HIGHWAY RESEARCH BOARD
PROJECT TR-713

F I N A L R E P O R T

LOAD RATING FOR STANDARD BRIDGES

IOWA DEPARTMENT OF TRANSPORTATION
AMES, IOWA 50010

DECEMBER 2016

TABLE OF CONTENTS

ACKNOWLEDGEMENT

Project TR-713 was sponsored by the Iowa Highway Research Board and the Iowa Department of Transportation. The Iowa Highway Research Board approved expenditures to conduct the engineering study. The engineering determinations for this project were conducted by Stanley Consultants, Inc.

DISCLAIMERS

INTRODUCTION

Load Rating: Evaluation of the capacity of a bridge to carry vehicle loads

Standard Bridge: Bridge built according to standards issued by the Iowa Department of Transportation

Inventory Rating: Load level which can safely utilize the bridge for an indefinite period of time

Operating Rating: Absolute maximum permissible load level for the bridge

A load rating states the load in tons which a vehicle can impose on a bridge. Changes in guidelines, standards, and customary uses of bridges require analyses of bridges to be updated and revaluated.

In this report, nine secondary and primary bridge standards for three types of bridges are rated utilizing Load Factor methodology and LARS Bridge software:

Precast Beam	Reinforced Concrete Slab	Rolled Steel Beam
H30-94	J24-87	RS40-04
	J30C-87	RS40-10
	J24-06	
	J30-06	
	J40-06	
	J44-06	

The ratings apply only to those bridges which:

(1) are built according to the applicable bridge standard plans,
(2) have no structural deterioration or damage, and
(3) have no added wearing surface in excess of one-half inch integral wearing surface.

Reinforced concrete slab bridges are rated for the following loads: operating level for special hauling vehicles (SHV) SU4, SU5, SU6, and SU7, and operating level for legal trucks (Types 4, 3S3A, 3-3, 3S3B and 4S3). Inventory and operating level ratings for HS20 were completed and reported as HS Ratings for HR-239 Phase IV report and are included in the tables below. Refer to HR-239 Phase IV report for assumptions used for HS20 ratings of J-Standards.

Precast beam bridges and rolled steel beam bridges are rated for the following loads: operating level for SHV (SU4, SU5, SU6, and SU7), operating level for legal trucks (Types 4, 3S3A, 3-3, 3S3B and 4S3), and inventory and operating levels for HS20.

The Inventory and Operating Ratings for HS20 are based on the standard AASHTO HS20-44 loading.

Load ratings listed in this report are in compliance with the 2011 AASHTO Manual for Bridge Evaluation, second edition.

Summary sheets contain any additional qualifications for interpreting the load ratings.

In agreement with the FHWA and to comply with FHWA policy, the Load Factor Ratings for the RS40-10 and the J-06 are valid for all bridges built before December 31st 2014. After that date, the bridges will need to be rated LRFR. Any bridge from this standard that is required to be re-rated, identified through inspection, shall be re-rated LRFR.

The proper use and application of these bridge ratings requires due consideration and evaluation by a qualified engineer of all relevant factors affecting these ratings. Anyone using any part of these bridge ratings assumes sole responsibility for their proper application.

References:

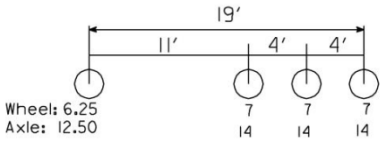
Manual for Bridge Evaluation, 2nd edition
prepared by Highway Subcommittee on Bridges and Structures
publ. American Association of State Highway and Transportation Officials, Washington, D.C. , 2011.

Standard Specifications For Highway Bridges, 17th ed.
as amended by Interim Specifications ,
prepared by Highway Subcommittee on Bridges and Structures
publ. American Association of State Highway and Transportation Officials, Washington, D.C. , 2000.

IOWA LEGAL TRUCKS DIAGRAMS

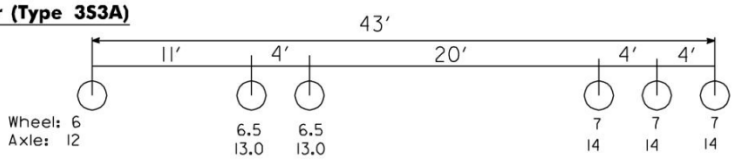
Straight Truck (Type 4)

Total Wt. = 54.5 Kips
(27.25 Tons)



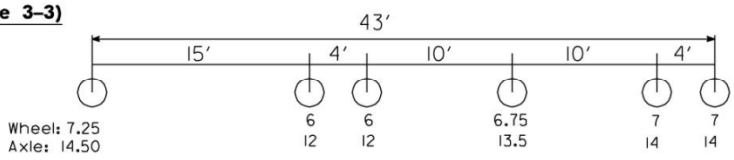
Truck + Semi-trailer (Type 3S3A)

Total Wt. = 80 Kips
(40 Tons)



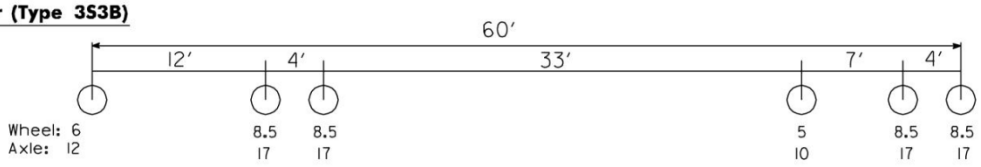
Truck + Trailer (Type 3–3)

Total Wt. = 80 Kips
(40 Tons)



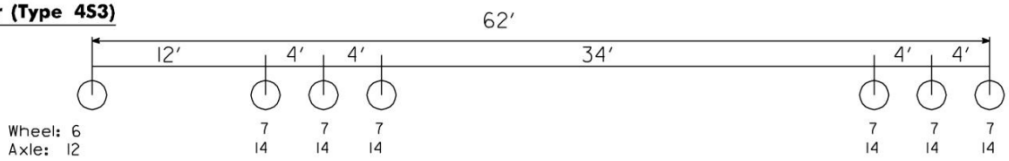
Truck + Semi-trailer (Type 3S3B)

Total Wt. = 90 Kips
(45 Tons)

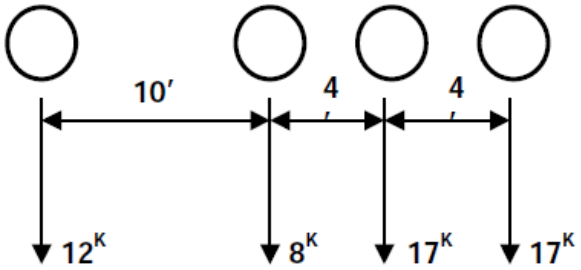


Truck + Semi-trailer (Type 4S3)

Total Wt. = 96 Kips
(48 Tons)

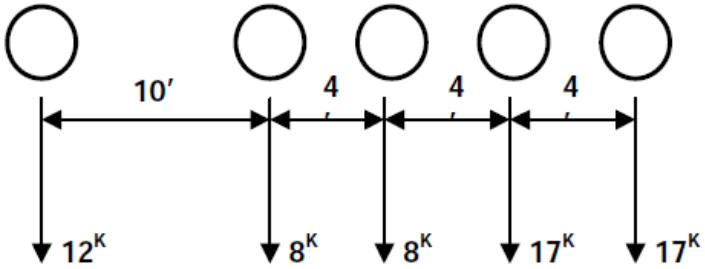


SPECIAL HAULING VEHICLES DIAGRAMS



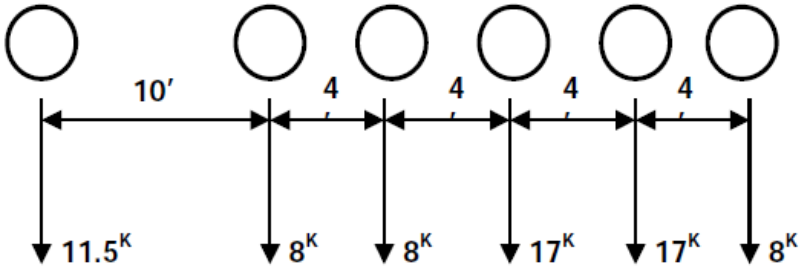
SU4 TRUCK

GVW = 54 KIPS



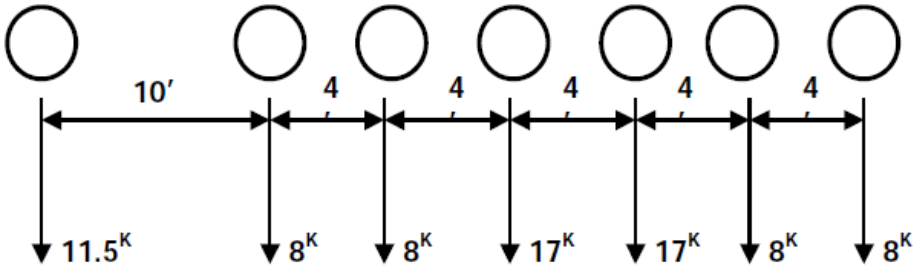
SU5 TRUCK

GVW = 62 KIPS



SU6 TRUCK

GVW = 69.5 KIPS



SU7 TRUCK

GVW = 77.5 KIPS

Precast Beam Bridge (H Series) Rating Summary 2016

Summary for Iowa DOT Precast Concrete Beam Bridges

H30-94 Standards (Issued 1994)

H30-94 Pretensioned Prestressed Concrete Beam Bridge Standards Load Rating Summary

2'-8" High Barrier Rail — Ratings are in TONS

Bridge Length	HS20-INV	HS20-OP	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
126'-4"	47.1	78.5	66.5	71.0	71.5	74.1	68.5	112.6	108.1	123.7	122.7
138'-10"	49.1	81.9	67.7	72.9	73.6	76.6	70.0	113.1	111.0	124.5	125.5
151'-4"	42.4	78.6	66.5	71.0	71.6	74.1	68.5	112.6	108.1	123.8	122.7
163'-10"	45.7	76.2	65.7	69.7	70.2	72.4	67.5	108.4	103.3	123.4	120.8
176'-4"	46.6	77.7	68.0	71.7	72.1	74.2	69.6	108.4	104.1	128.6	124.5
188'-10"	44.6	81.3	72.0	75.6	76.0	78.0	73.6	111.6	107.3	137.2	131.6
201'-4"	48.6	82.2	73.6	76.9	77.3	79.2	75.1	111.1	105.6	140.8	134.1
213'-10"	43.7	82.6	74.5	77.6	78.0	79.7	75.9	108.2	102.2	143.3	135.6
226'-4"	43.3	86.5	78.6	81.7	82.1	83.8	80.0	112.6	106.6	151.8	142.9
243'-0"	43.3	89.7	82.5	85.4	85.7	87.2	83.8	113.4	107.3	152.7	146.4

2'-5" High Open Rail — Ratings are in TONS

Bridge Length	HS20-INV	HS20-OP	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
126'-4"	47.4	79.0	66.9	71.4	72.0	74.6	68.9	113.3	108.7	124.4	123.4
138'-10"	49.4	82.3	68.1	73.3	74.0	77.0	70.4	113.7	111.7	125.2	126.2
151'-4"	43.0	79.1	66.9	71.5	72.0	74.6	68.9	113.3	108.8	124.5	123.5
163'-10"	46.0	76.7	66.2	70.2	70.6	72.9	67.9	109.1	104.0	124.2	121.6
176'-4"	46.9	78.2	68.4	72.2	72.6	74.7	70.1	109.2	104.8	129.5	125.4
188'-10"	45.2	81.9	72.6	76.2	76.6	78.6	74.2	112.4	108.1	138.2	132.6
201'-4"	49.3	82.8	74.1	77.5	77.9	79.7	75.6	111.9	106.3	141.9	135.1
213'-10"	44.4	83.2	75.1	78.2	78.6	80.3	76.5	109.0	103.0	144.4	136.6
226'-4"	44.0	87.2	79.2	82.3	82.7	84.4	80.6	113.4	107.4	153.0	144.0
243'-0"	44.1	90.4	83.2	86.0	86.4	87.9	84.5	114.3	108.2	153.8	147.5

Note: 1. Ratings were calculated using ½" integral wearing surface deducted from the slab thickness as shown on the standard plans.
2. Nominal roadway width is 30 feet.

Slab Bridge (J Series) Rating Summary 2016

Summary for Iowa DOT Standard Concrete Slab Bridges

J24-87
J30C-87
J24-06
J30-06
J40-06
J44-06

J24-87 Standards (Issued 1987)

J24-87 Slab Bridge Standards Load Rating Summary

2'-8" High Barrier Rail — Ratings are in TONS, except as noted*

Built with Flat Bottom Option:

Bridge Length	HS20-INV*	HS20-OP*	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
75'-0"	HS 31.5	HS 52.6	67.6	74.8	77.7	84.7	71.6	110.0	128.2	117.3	125.3
87'-6"	HS 31.1	HS 52.0	69.6	76.3	78.5	84.2	73.1	109.1	125.8	126.6	136.7
100'-0"	HS 32.6	HS 54.5	74.2	80.8	83.4	88.5	77.3	116.3	135.7	133.1	138.1
112'-6"	HS 33.8	HS 56.4	78.7	84.9	87.9	92.5	81.4	124.0	144.2	141.7	139.9
125'-0"	HS 35.4	HS 59.1	84.5	90.7	92.9	97.2	87.4	133.5	149.6	139.6	138.5

Built with Sloped Bottom Option:

Bridge Length	HS20-INV*	HS20-OP*	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
75'-0"	HS 27.8	HS 46.4	61.5	68.0	70.7	77.1	65.2	100.1	114.4	106.7	114.1
87'-6"	HS 27.6	HS 46.1	63.7	69.8	71.8	77.0	66.9	97.8	112.8	115.8	125.0
100'-0"	HS 29.2	HS 48.8	68.4	74.5	76.8	81.6	71.2	105.2	122.7	122.7	127.3
112'-6"	HS 30.4	HS 50.7	72.7	78.5	81.2	85.4	75.3	112.5	130.8	128.5	126.9
125'-0"	HS 32.2	HS 53.7	78.8	84.5	86.5	90.5	81.4	122.4	137.1	128.0	127.0

*Multiply tabulated value by 1.8 to obtain rating in TONS

2'-5" High Open Rail — Ratings are in TONS, except as noted*

Built with Flat Bottom Option:

Bridge Length	HS20-INV*	HS20-OP*	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
75'-0"	HS 31.6	HS 52.8	67.8	75.0	77.9	85.0	71.9	110.3	128.9	117.6	125.7
87'-6"	HS 31.2	HS 52.1	69.9	76.5	78.7	84.5	73.4	109.8	126.6	127.1	137.2
100'-0"	HS 32.7	HS 54.6	74.4	81.1	83.7	88.9	77.6	117.0	136.6	133.6	138.6
112'-6"	HS 33.9	HS 56.6	78.9	85.2	88.2	92.9	81.8	124.9	145.3	142.7	141.0
125'-0"	HS 35.5	HS 59.3	84.8	91.0	93.3	97.6	87.8	134.5	150.7	140.7	139.6

Built with Sloped Bottom Option:

Bridge Length	HS20-INV*	HS20-OP*	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
75'-0"	HS 27.9	HS 46.6	61.7	68.3	70.9	77.3	65.4	100.4	115.1	107.1	114.4
87'-6"	HS 27.7	HS 46.3	63.9	70.0	72.0	77.3	67.2	98.5	113.6	116.3	125.5
100'-0"	HS 29.4	HS 49.0	68.6	74.8	77.1	81.9	71.6	106.0	123.6	123.2	127.8
112'-6"	HS 30.5	HS 51.0	73.0	78.8	81.5	85.8	75.6	113.4	131.9	129.6	128.0
125'-0"	HS 32.3	HS 53.9	79.1	84.9	86.9	90.9	81.8	123.4	138.3	129.1	128.1

*Multiply tabulated value by 1.8 to obtain rating in TONS

Note: 1. Ratings were calculated using ½" integral wearing surface deducted from the slab thickness as shown on the standard plans.
2. Nominal roadway width is 24 feet.
3. Refer to HR-239 Phase IV report for assumptions used for HS20 ratings.

J30C-87 Standards (Issued 1987)

J30C-87 Slab Bridge Standards Load Rating Summary

2'-8" High Barrier Rail — Ratings are in TONS, except as noted*

Built with Flat Bottom Option:

Bridge Length	HS20-INV*	HS20-OP*	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
75'-0"	HS 31.6	HS 52.8	69.5	76.8	79.8	87.0	73.6	113.0	132.8	120.5	128.8
87'-6"	HS 31.3	HS 52.2	71.5	78.3	80.6	86.5	75.1	112.9	130.2	130.0	140.4
100'-0"	HS 32.8	HS 54.7	76.0	82.8	85.5	90.8	79.2	120.2	140.2	136.5	141.5
112'-6"	HS 33.9	HS 56.6	80.6	87.0	90.1	94.8	83.4	128.2	149.1	146.5	144.6
125'-0"	HS 35.5	HS 59.3	86.4	92.7	95.1	99.4	89.3	137.7	154.3	144.0	142.9

Built with Sloped Bottom Option:

Bridge Length	HS20-INV*	HS20-OP*	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
75'-0"	HS 27.9	HS 46.6	61.8	68.3	71.0	77.4	65.6	100.5	115.3	107.2	114.5
87'-6"	HS 27.8	HS 46.4	64.0	70.1	72.1	77.4	67.2	98.7	113.8	116.4	125.6
100'-0"	HS 29.4	HS 49.0	68.7	74.9	77.2	82.0	71.6	106.1	123.8	123.3	127.9
112'-6"	HS 30.5	HS 50.9	73.1	78.9	81.6	85.9	75.7	113.6	132.1	129.8	128.2
125'-0"	HS 32.4	HS 54.0	79.2	85.0	87.0	91.0	81.9	123.7	138.6	129.4	128.4

*Multiply tabulated value by 1.8 to obtain rating in TONS

2'-5" High Open Rail — Ratings are in TONS, except as noted*

Built with Flat Bottom Option:

Bridge Length	HS20-INV*	HS20-OP*	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
75'-0"	HS 31.7	HS 52.9	69.6	77.0	80.0	87.2	73.7	113.3	133.3	120.8	129.1
87'-6"	HS 31.3	HS 52.3	71.7	78.5	80.8	86.7	75.2	113.4	130.8	130.4	140.7
100'-0"	HS 32.8	HS 54.8	76.2	83.1	85.7	91.0	79.4	120.7	140.9	136.8	141.9
112'-6"	HS 34.0	HS 56.8	80.8	87.2	90.4	95.1	83.7	128.9	149.9	147.0	145.4
125'-0"	HS 35.6	HS 59.5	86.7	93.0	95.4	99.7	89.6	138.5	155.2	144.9	143.7

Built with Sloped Bottom Option:

Bridge Length	HS20-INV*	HS20-OP*	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
75'-0"	HS 28.0	HS 46.7	61.9	68.5	71.2	77.6	65.6	100.8	115.8	107.5	114.8
87'-6"	HS 27.8	HS 46.5	64.2	70.3	72.3	77.6	67.4	99.2	114.4	116.7	126.0
100'-0"	HS 29.5	HS 49.2	68.9	75.1	77.4	82.2	71.7	106.7	124.5	123.7	128.3
112'-6"	HS 30.6	HS 51.1	73.3	79.1	81.8	86.1	75.9	114.3	132.9	130.6	129.0
125'-0"	HS 32.4	HS 54.2	79.4	85.2	87.3	91.3	82.1	124.5	139.5	130.2	129.2

*Multiply tabulated value by 1.8 to obtain rating in TONS

Note: 1. Ratings were calculated using ½" integral wearing surface deducted from the slab thickness as shown on the standard plans.
2. Nominal roadway width is 30 feet.
3. Refer to HR-239 Phase IV report for assumptions used for HS20 ratings.

J24-06 Standards (Issued 2006)

J24-06 Slab Bridge Standards Load Rating Summary

2'-8" High Open Rail

Ratings are in TONS, except as noted*

Bridge Length	HS20-INV*	HS20-OP*	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
70'-0"	HS 25.6	HS 42.7	67.4	74.5	77.7	83.9	71.4	95.7	106.5	116.4	124.2
80'-0"	HS 25.0	HS 41.7	62.5	68.9	71.3	77.2	66.1	99.9	114.9	109.3	118.8
90'-0"	HS 24.5	HS 40.9	62.2	68.0	69.8	74.8	65.2	94.7	109.4	115.2	123.4
100'-0"	HS 24.8	HS 41.4	63.4	68.9	70.5	74.9	66.4	105.4	122.9	122.9	127.4
110'-0"	HS 24.5	HS 40.8	64.0	69.2	71.1	75.0	66.4	104.0	125.7	116.2	118.8
120'-0"	HS 25.9	HS 43.2	67.7	72.8	74.1	77.6	70.1	111.4	126.2	123.5	122.7
130'-0"	HS 26.5	HS 44.3	70.3	75.2	77.5	81.0	72.6	117.1	126.3	123.8	122.8
140'-0"	HS 28.2	HS 47.0	74.9	79.7	81.4	84.7	77.1	126.0	126.9	124.8	123.6
150'-0"	HS 27.7	HS 46.2	73.4	77.8	78.7	81.7	75.6	121.8	118.6	117.4	116.8

*Multiply tabulated value by 1.8 to obtain rating in TONS

Note: 1. Ratings were calculated using ½" integral wearing surface deducted from the slab thickness as shown on the standard plans.
2. Nominal roadway width is 24 feet.
3. Refer to HR-239 Phase IV report for assumptions used for HS20 ratings.
4. Rail height has changed since Phase IV ratings. HS20 ratings will vary slightly from tabulated values.

J30-06 Standards (Issued 2006)

J30-06 Slab Bridge Standards Load Rating Summary

2'-10" High Barrier Rail — Ratings are in TONS, except as noted*

Bridge Length	HS20-INV*	HS20-OP*	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
70'-0"	HS 25.3	HS 42.3	67.5	74.7	77.9	84.1	71.6	96.0	106.9	116.5	124.4
80'-0"	HS 24.8	HS 41.3	62.6	69.0	71.4	77.3	66.1	100.3	115.3	109.5	119.0
90'-0"	HS 24.3	HS 40.5	62.3	68.1	69.9	74.8	65.2	94.9	109.6	115.3	123.5
100'-0"	HS 24.6	HS 41.0	63.5	69.0	70.6	74.9	66.4	105.6	123.2	123.0	127.6
110'-0"	HS 24.2	HS 40.4	64.1	69.3	71.2	75.0	66.4	104.1	125.9	116.3	118.9
120'-0"	HS 25.6	HS 42.8	67.8	72.9	74.1	77.7	70.1	111.6	126.4	123.7	123.0
130'-0"	HS 26.3	HS 43.9	70.4	75.3	77.6	81.1	72.6	117.3	126.4	124.1	123.1
140'-0"	HS 27.9	HS 46.6	75.0	79.8	81.5	84.8	77.1	126.1	127.1	125.2	123.9
150'-0"	HS 27.4	HS 45.8	73.5	78.0	78.8	81.8	75.8	121.9	118.8	117.7	117.1

*Multiply tabulated value by 1.8 to obtain rating in TONS

2'-8" High Open Rail — Ratings are in TONS, except as noted*

Bridge Length	HS20-INV*	HS20-OP*	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
70'-0"	HS 25.6	HS 42.7	67.6	74.8	78.0	84.5	71.8	96.4	107.4	116.8	124.6
80'-0"	HS 25.0	HS 41.7	62.7	69.2	71.6	77.5	66.4	100.7	115.8	109.8	119.3
90'-0"	HS 24.5	HS 40.9	62.4	68.3	70.1	75.1	65.6	95.4	110.2	115.7	123.9
100'-0"	HS 24.8	HS 41.4	63.7	69.3	70.9	75.3	66.7	106.3	124.1	123.5	128.1
110'-0"	HS 24.5	HS 40.8	64.4	69.6	71.5	75.4	66.7	104.6	126.9	116.8	119.4
120'-0"	HS 25.9	HS 43.2	68.1	73.2	74.5	78.1	70.4	112.1	127.0	124.7	124.0
130'-0"	HS 26.5	HS 44.3	70.7	75.7	77.9	81.5	72.9	117.8	127.1	125.2	124.2
140'-0"	HS 28.2	HS 47.0	75.3	80.2	81.9	85.2	77.6	126.7	127.8	126.4	125.1
150'-0"	HS 27.7	HS 46.2	73.9	78.4	79.3	82.3	76.1	122.7	119.5	119.0	118.4

*Multiply tabulated value by 1.8 to obtain rating in TONS

Note: 1. Ratings were calculated using ½" integral wearing surface deducted from the slab thickness as shown on the standard plans.
2. Nominal roadway width is 30 feet.
3. Refer to HR-239 Phase IV report for assumptions used for HS20 ratings.
4. Rail height has changed since Phase IV ratings. HS20 ratings will vary slightly from tabulated values.

J40-06 Standards (Issued 2006)

J40-06 Slab Bridge Standards Load Rating Summary

2'-10" High Barrier Rail — Ratings are in TONS, except as noted*

Bridge Length	HS20-INV*	HS20-OP*	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
70'-0"	HS 25.3	HS 42.3	67.8	75.0	78.2	84.9	71.9	96.8	107.9	117.1	124.9
80'-0"	HS 24.8	HS 41.3	62.9	69.4	71.8	77.7	66.6	101.2	116.4	110.1	119.6
90'-0"	HS 24.3	HS 40.5	62.6	68.5	70.3	75.3	65.7	95.9	110.8	116.0	124.2
100'-0"	HS 24.6	HS 41.0	63.9	69.4	71.0	75.4	66.9	106.7	124.5	123.7	128.3
110'-0"	HS 24.2	HS 40.4	64.5	69.8	71.7	75.6	66.9	104.8	127.4	117.1	119.7
120'-0"	HS 25.6	HS 42.8	68.2	73.4	74.7	78.3	70.6	112.3	127.3	125.0	124.6
130'-0"	HS 26.3	HS 43.9	70.9	75.8	78.1	81.7	73.1	118.1	127.4	125.8	124.7
140'-0"	HS 27.9	HS 46.6	75.5	80.4	82.1	85.4	77.7	127.0	128.1	127.0	125.7
150'-0"	HS 27.4	HS 45.8	74.2	78.7	79.5	82.5	76.4	123.0	119.8	119.7	119.0

*Multiply tabulated value by 1.8 to obtain rating in TONS

2'-8" High Open Rail — Ratings are in TONS, except as noted*

Bridge Length	HS20-INV*	HS20-OP*	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
70'-0"	HS 25.6	HS 42.7	67.9	75.1	78.3	85.2	72.1	97.1	108.2	117.3	125.1
80'-0"	HS 25.0	HS 41.7	63.0	69.5	71.9	77.9	66.6	101.6	116.8	110.3	119.8
90'-0"	HS 24.5	HS 40.9	62.8	68.7	70.5	75.5	65.9	96.4	111.4	116.3	124.6
100'-0"	HS 24.8	HS 41.4	64.1	69.7	71.3	75.7	67.1	107.3	125.2	124.0	128.7
110'-0"	HS 24.5	HS 40.8	64.7	70.0	71.9	75.8	67.1	105.2	128.2	117.5	120.1
120'-0"	HS 25.9	HS 43.2	68.5	73.7	75.0	78.6	70.9	112.7	127.8	125.4	125.4
130'-0"	HS 26.5	HS 44.3	71.1	76.1	78.4	82.0	73.4	118.5	127.9	126.6	125.6
140'-0"	HS 28.2	HS 47.0	75.8	80.7	82.5	85.8	77.9	127.5	128.6	127.9	126.6
150'-0"	HS 27.7	HS 46.2	74.5	79.0	79.9	82.9	76.7	123.6	120.4	120.7	120.0

*Multiply tabulated value by 1.8 to obtain rating in TONS

Note: 1. Ratings were calculated using ½" integral wearing surface deducted from the slab thickness as shown on the standard plans.
2. Nominal roadway width is 40 feet.
3. Refer to HR-239 Phase IV report for assumptions used for HS20 ratings.
4. Rail height has changed since Phase IV ratings. HS20 ratings will vary slightly from tabulated values.

J44-06 Standards (Issued 2006)

J44-06 Slab Bridge Standards Load Rating Summary

2'-10" High Barrier Rail — Ratings are in TONS, except as noted*

Bridge Length	HS20-INV*	HS20-OP*	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
70'-0"	HS 25.3	HS 42.3	67.8	75.1	78.3	85.0	71.9	97.0	108.0	117.2	125.0
80'-0"	HS 24.8	HS 41.3	63.0	69.5	71.8	77.8	66.6	101.4	116.6	110.2	119.7
90'-0"	HS 24.3	HS 40.5	62.7	68.5	70.4	75.3	65.7	96.1	111.0	116.1	124.4
100'-0"	HS 24.6	HS 41.0	63.9	69.5	71.1	75.5	66.9	106.9	124.7	123.8	128.4
110'-0"	HS 24.2	HS 40.4	64.6	69.9	71.8	75.7	67.1	104.9	127.7	117.2	119.8
120'-0"	HS 25.6	HS 42.8	68.3	73.5	74.8	78.4	70.7	112.5	127.5	125.2	124.8
130'-0"	HS 26.3	HS 43.9	71.0	75.9	78.2	81.8	73.2	118.3	127.6	126.1	125.0
140'-0"	HS 27.9	HS 46.6	75.6	80.5	82.2	85.6	77.7	127.2	128.3	127.3	126.0
150'-0"	HS 27.4	HS 45.8	74.3	78.8	79.7	82.6	76.4	123.2	120.0	120.0	119.3

*Multiply tabulated value by 1.8 to obtain rating in TONS

2'-8" High Open Rail — Ratings are in TONS, except as noted*

Bridge Length	HS20-INV*	HS20-OP*	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
70'-0"	HS 25.6	HS 42.7	68.0	75.2	78.5	85.4	72.1	97.4	108.5	117.5	125.3
80'-0"	HS 25.0	HS 41.7	63.1	69.6	72.0	78.0	66.7	101.9	117.1	110.4	120.0
90'-0"	HS 24.5	HS 40.9	62.9	68.7	70.6	75.6	65.9	96.6	111.6	116.5	124.7
100'-0"	HS 24.8	HS 41.4	64.2	69.7	71.3	75.7	67.1	107.5	125.4	124.2	128.8
110'-0"	HS 24.5	HS 40.8	64.8	70.1	72.0	75.9	67.2	105.3	128.4	117.6	120.2
120'-0"	HS 25.9	HS 43.2	68.5	73.7	75.0	78.7	70.9	112.9	127.9	125.6	125.6
130'-0"	HS 26.5	HS 44.3	71.2	76.2	78.5	82.1	73.6	118.7	128.0	126.9	125.9
140'-0"	HS 28.2	HS 47.0	75.9	80.8	82.6	85.9	78.1	127.6	128.8	128.2	126.9
150'-0"	HS 27.7	HS 46.2	74.6	79.1	80.0	83.0	76.7	123.7	120.5	121.0	120.3

*Multiply tabulated value by 1.8 to obtain rating in TONS

Note: 1. Ratings were calculated using ½" integral wearing surface deducted from the slab thickness as shown on the standard plans.
2. Nominal roadway width is 44 feet.
3. Refer to HR-239 Phase IV report for assumptions used for HS20 ratings.
4. Rail height has changed since Phase IV ratings. HS20 ratings will vary slightly from tabulated values.

Rolled Steel Beam Bridge (RS Series) Rating Summary 2016

Summary for Iowa DOT Rolled Steel Beam Bridges

RS40-10 Standards (Issued 2010)

RS40-10 Rolled Steel Beam Bridge Standards Load Rating Summary

2'-10" High Barrier Rail — Ratings are in TONS

Bridge Length	HS20-INV	HS20-OP	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
160'-0"	47.7	79.4	78.5	82.6	83.2	85.7	80.3	98.3	101.0	95.7	94.7
180'-0"	49.5	82.5	75.8	79.3	79.9	82.0	77.4	111.5	109.2	104.5	103.4
200'-0"	51.6	86.0	79.5	82.9	83.4	85.3	81.1	114.7	109.8	116.4	114.8
220'-0"	52.7	87.9	86.9	90.3	90.8	92.7	88.4	121.2	116.2	127.9	126.0
240'-0"	52.0	86.7	99.4	102.9	103.4	105.3	101.0	128.1	126.7	135.6	133.6
260'-0"	57.7	96.2	94.3	97.4	97.8	99.6	95.7	124.7	120.4	160.2	153.4
280'-0"	54.7	91.1	95.0	97.9	98.3	99.9	96.3	123.0	118.9	155.1	148.7
300'-0"	55.0	91.7	99.4	102.2	102.5	104.2	100.7	126.5	122.5	156.6	150.7
320'-0"	54.7	91.2	100.6	103.2	103.6	105.1	101.8	126.0	122.4	153.9	148.4
340'-0"	52.3	87.1	109.3	111.9	112.3	113.8	110.5	134.6	131.1	162.5	156.8

Note: 1. Ratings were calculated using ½" integral wearing surface deducted from the slab thickness as shown on the standard plans.
2. Nominal roadway width is 40 feet.

RS40-04 Standards (Issued 2004)

RS40-04 Rolled Steel Beam Bridge Standards Load Rating Summary

2'-10" High Barrier Rail — Ratings are in TONS

Bridge Length	HS20-INV	HS20-OP	SU4	SU5	SU6	SU7	Type 4	Type 3S3A	Type 3-3	Type 3S3B	Type 4S3
160'-0"	37.1	61.8	54.1	56.9	57.4	59.1	55.4	85.7	81.8	93.2	92.0
180'-0"	38.2	63.6	56.6	59.2	59.6	61.1	57.8	85.1	81.4	94.1	93.2
200'-0"	39.2	65.4	58.9	61.4	61.8	63.2	60.1	85.0	81.2	102.0	100.8
220'-0"	40.7	67.8	62.1	64.5	64.8	66.1	63.2	86.4	82.6	98.0	97.0
240'-0"	41.5	69.2	63.5	65.8	66.1	67.3	64.5	85.7	82.5	108.1	106.6
260'-0"	38.8	64.6	59.7	61.6	61.9	63.0	60.5	78.9	76.1	101.3	97.0
280'-0"	39.8	66.4	61.6	63.5	63.7	64.8	62.5	79.7	77.1	100.6	96.4
300'-0"	40.8	67.9	63.4	65.1	65.3	66.4	64.2	80.5	77.9	99.6	95.8

Note: 1. Ratings were calculated using ½" integral wearing surface deducted from the slab thickness as shown on the standard plans.
2. Nominal roadway width is 40 feet.
3. RS40-04 ratings were provided by the Iowa DOT.